



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,398	12/08/2003	Thomas R. Bieler	655000013COA	6179

27572 7590 07/16/2007  
HARNESS, DICKEY & PIERCE, P.L.C.  
P.O. BOX 828  
BLOOMFIELD HILLS, MI 48303

EXAMINER
----------

IP, SIKYIN

ART UNIT	PAPER NUMBER
----------	--------------

1742

MAIL DATE	DELIVERY MODE
-----------	---------------

07/16/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/730,398

Applicant(s)

BIELER ET AL.

Examiner

Sikyln Ip

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 4/9/07.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 20-62 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-62 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/12/06.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 20-24, 27-33, 36, 37, 39-45, 47-53, 55-59, and 62 are rejected under 35 U.S.C. § 103 as being unpatentable over USP 5527628 to Anderson et al (PTO-1449).

Anderson discloses the feature including steps of combining a solder with the components of the intermetallic phase such as Cu, Ag, and/or Sn to form a mixture (col. 2, lines 60-64; col. 5, line 59 to col. 6, line 12). The mixture can be formed as composite solder wire, solder sheet, solder ingot, and solder powder (col. 5, lines 60-62). The composite solder melt can be chill cast (col. 5, line 67 to col. 6, line 2) to form an ingot which could be used to form ultrafine solder powder by melt atomization (col. 6, lines 14-15). But, Anderson does not disclose the claimed cooling rate and does not

Art Unit: 1742

explicitly disclose the intermetallic particle size. Anderson discloses the solder powder is produced by conventional atomization techniques (col. 6, lines 14-50) which is known in the art of cited reference that the cooling rate is at least 100 °C/sec. The examiner takes the official notice that conventional atomization methods would have the cooling rate at least 100 °C/sec. Moreover, in paragraph bridging col. 6 and 7, Anderson discloses slow cooling rate would coarsening the intermetallic phases. Since the instant claimed solder elements and atomization method are overlapped by the cited reference; consequently, the particle size as recited in the instant claims would have been inherently possessed by the teaching of the cited reference. Furthermore, Anderson discloses the intermetallic phases are dispersed in the ultrafine solder powder which has size less than 25 µm (col. 6, lines 3-44). Therefore, the burden is on the applicant to prove that the product of the prior art does not necessarily or inherently possess characteristics attributed to the claimed product.

In re Best, 195 USPQ, 430 and MPEP § 2112.01.

"Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, In re Best, 195 USPQ 430, 433 (CCPA 1977). 'When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not.' In re Spada, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the prima facie case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. In re Best, 195 USPQ 430, 433 (CCPA 1977)."

Claims 25, 26, 38, 46, and 61 are rejected under 35 U.S.C. § 103 as being unpatentable over USP 5527628 to Anderson et al (PTO-1449) in view of USP 5520752 to Lucey, Jr. et al.

The claimed subject matter as is disclosed and rejected above by Anderson except for the different intermetallic phases and cooling methods. However, Lucey in col. 3, line 64 to col. 4, line 5 teaches the other claimed intermetallic phases in the eutectic solder alloys and their cooling methods which are conventional methods to produce conventional solders. It has been held that combining known ingredient having known functions, to provide a composition having the additive effect of each of the known functions is within realm of performance of ordinary skill artisan. In re Castner, 186 USPQ 213 (217). The use of conventional materials to perform their known functions in a conventional process is obvious. In re Raner, 134 USPQ 343 (CCPA 1962).

Claims 34, 35, 54, and 60 are rejected under 35 U.S.C. § 103 as being unpatentable over USP 5527628 to Anderson et al (PTO-1449) in view of Gibson et al (PTO-1449).

The claimed subject matter as is disclosed and rejected above by Anderson except for the volume of the intermetallic phase. However, Gibson in abstract teaches 20 volume percent intermetallic phase would improve fatigue resistance. Therefore, it would have been obvious to one having ordinary skill in the art of the cited references at the time the invention was made to employ the teachings as taught by Gibson in order to improve the solder fatigue resistance.

### ***Response to Arguments***

Applicant's declaration filed December 12, 2006 and arguments filed April 9, 2007 have been fully considered but they are not persuasive.

5. The '628 patent sets forth erroneous compositional ranges, including an erroneous eutectic composition for the Sn-Ag-Cu system. This error has been recognized by those of skill in the art, including various third parties. The Moon article (C) acknowledges this error and further states on Pages 1122 to 1123 that "[p]reliminary thermodynamic calculations performed by one of the authors [ ] and reported by Miller et al. [B] predicted a ternary eutectic...an error was made in the conversion from atomic to weight % conversion by Miller et al."

6. The Moon article (C) reports that the ternary eutectic composition for the Sn-Ag-Cu system is 3.5 wt. % Ag - 0.9 wt. % Cu - 95.6 wt. % Sn, with a eutectic temperature of approximately 217°C, which is now widely accepted in the art.

7. As such, those of skill in the art recognize that the compositional ranges for the eutectic Sn, Ag, and Cu system set forth in the '628 patent are incorrect and the '628 patent does not teach a

Applicants argue that " eutectic lead-free solder composition. "

But, it is immaterial because examples of the cited reference are given by way of illustration and not by way of limitation. In re Widmer, 353 F.2d 752, 757, 147 USPQ 518, 523 (CCPA 1965), In re Boe, 148 USPQ 507 (CCPA 1966), and In re Snow, 176 USPQ 328. Applicants' attention is directed to col. 2, lines 60-64 of Anderson below:

60 eutectic melting temperature.

In one embodiment of the invention, the Pb-free solder consists essentially of about 3.5 to about 7.7 weight % Ag, about 1.0 to about 4.0 weight % Cu and the balance essentially Sn.

Ordinary skill artisan has no

need to modify the Cu-Ag-Sn alloy composition since instant claimed composition is overlapped by Anderson.

Applicants' argument with respect to claim 54 is noted. But, it is immaterial because the intermetallic compounds such as Sn-Cu, Ag<sub>3</sub>Sn, and/or Cu<sub>6</sub>Sn<sub>5</sub> are formed in-situ.

Art Unit: 1742

## Conclusion

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

### Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Ip whose telephone number is (571) 272-1241. The examiner can normally be reached on Monday to Friday from 5:30 A.M. to 2:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King, can be reached on (571)-272-1244.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

Art Unit: 1742

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



SIKYIN IP  
PRIMARY EXAMINER  
ART UNIT 1742

S. Ip  
July 8, 2007